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DESTRUCTION OF WOLVES AND COYOTES.

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RESULTS OBTAINED DURING 1907.

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Wolves and coyotes cause a loss to the stockmen and farmers of the United States of several millions of dollars annually, and in some of the Northern States they threaten the extermination of deer on

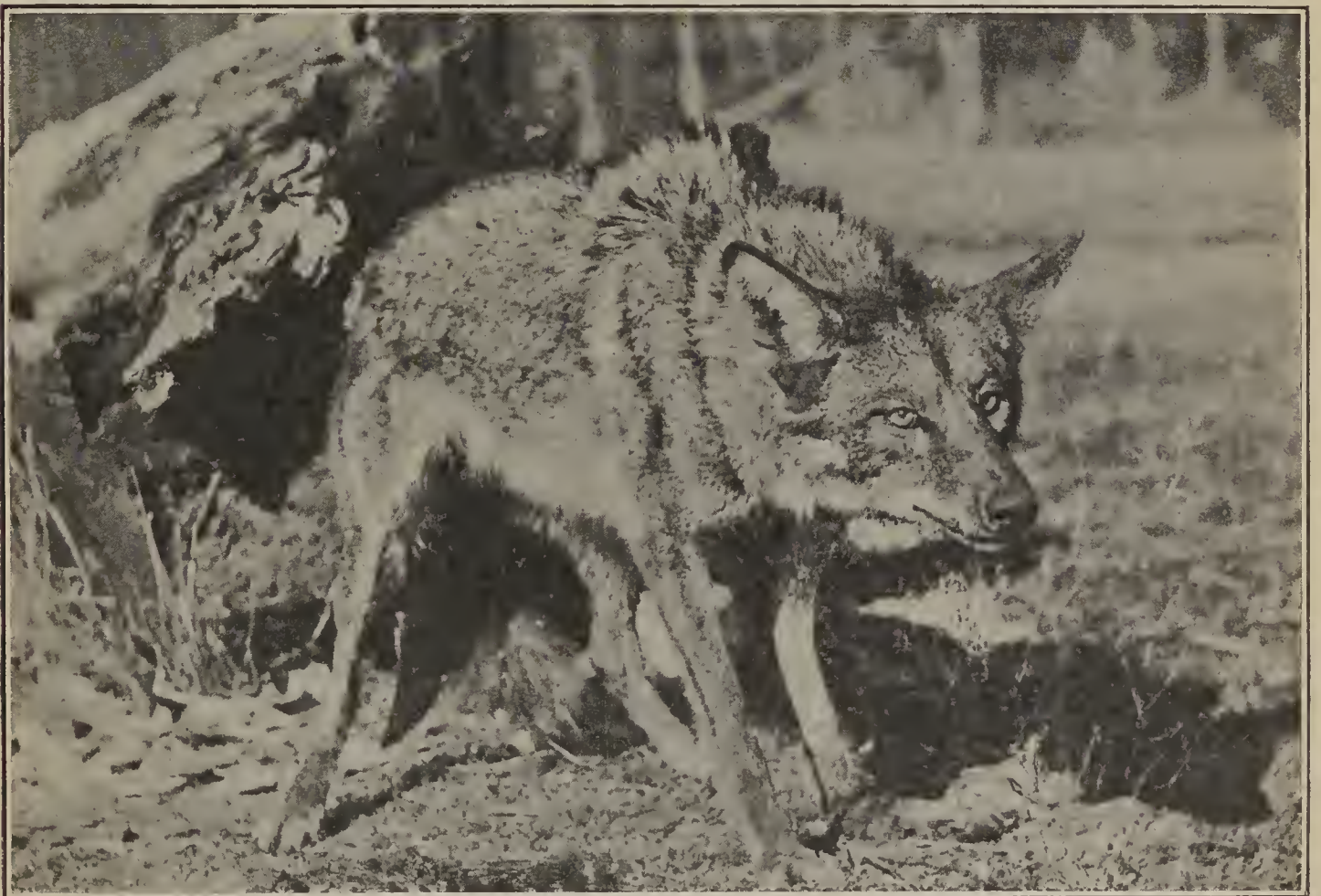


FIG. 1.—Coyote.

many of the best hunting grounds. These losses can be prevented only by intelligent and concerted action throughout the wolf-infested country, and the Biological Survey aims to furnish information that



will aid in securing the best results in the war against these pests. Early in 1907 a bulletin and two circulars on wolves were widely distributed in the region where the animals are most destructive.<sup>a</sup> These publications contain brief records of losses from wolves, and directions for finding the dens and capturing the pups, for trapping and poisoning the old wolves, and for building wolf-proof fences. A year has passed since the publications were distributed, and while complete returns giving total results are not at hand, the records received indicate a marked increase in the number of wolves destroyed.

#### BOUNTY RECORDS.

Wyoming is the only wolf-infested State from which satisfactory bounty records are obtainable. During the year ending October 1, 1906, or previous to the distribution of the wolf circulars, approximately 1,607 wolves were presented for bounty.<sup>b</sup> During the year beginning March 1, 1907, or after the wolf circulars were distributed, 2,035 wolves were presented, showing an increase over the preceding year of 328.<sup>c</sup>

#### DATES OF BREEDING AND NUMBER OF PUPS.

Of primary importance in the warfare against wolves is a thorough knowledge of their breeding habits, since the location of the dens and capture of the young constitute the most effective means of reducing their numbers. Every record of dens found, with date, age of pups, and character of den, adds to our knowledge of the breeding habits of the animal, makes it easier to find other dens, and stimulates hunters to search for them.

In the western United States wolves are usually born from March 9 to April 15, and coyotes from April 1 to May 15. As the pups remain in or near the dens until 2 or 3 months old, the time for hunting dens may be extended through May and June. The following data are given as bearing on the time of breeding.

#### WYOMING.

In the spring of 1906, at the instance of the Forest Service and Biological Survey, I visited the upper part of Green River Valley, west of the Wind River Mountains, Wyoming, to investigate the

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<sup>a</sup> Bulletin No. 72 of the Forest Service, Wolves in Relation to Stock, Game, and the National Forest Reserves, January 19, 1907. Circular No. 55 of the Biological Survey, Directions for the Destruction of Wolves and Coyotes, March 13, 1907. Circular No. 58, Destruction of Deer by the Northern Timber Wolf, May 4, 1907.

<sup>b</sup> Biennial Report of Wyoming State Auditor (for 1905 and 1906), p. 26—3,214 wolves for two years.

<sup>c</sup> From data furnished by the Wyoming State auditor.

damage done by wolves and study their breeding habits. Four wolf dens containing a total of 32 pups were found, and much interest in locating the dens was aroused among the ranchmen in the valley, first by personal intercourse and later by the distribution of publications.

The following spring (1907) 47 pups were taken by residents from 6 dens—evidently all there were in the valley. In fact, the competition in hunting wolf dens was so keen that all 6 were located by ranchmen before the 2 forest rangers detailed for the purpose got into the valley. Although excellent hunters, the rangers could find no more occupied dens.

The approximate localities and dates of these 6 litters of pups were: Near Stanley, March 25, 8 pups; near Big Piney, March 27, 7 pups 10 days old; near Silver Creek, April 2, 5 pups; hills west of Green River, about April 12, 11 pups; near Soda Lake, April 22, 9 pups about 5 weeks old; New Fork, 4 miles east of the Luman Ranch, May 3, 7 pups.<sup>a</sup>

Along the east base of the Wind River Mountains 6 dens with 33 pups were found in April and May, 1907, by forest rangers. The dates and numbers of pups were as follows: April 3, 8 pups about 6 days old; April 11, 5 pups about 15 days old; April 18, 7 pups about 3 weeks old; April 23, 5 pups about 3 weeks old; May 5, 4 pups about a month old; May 7, 4 pups about a month old. A few other dens were reported by outsiders.

These 12 dens and 70 pups were all in or near the southwest corner of Fremont County, and mainly in the open or foothill country below the national forests.

#### NEW MEXICO.

On the Gila National Forest a den was found on March 13 containing 8 wolf pups with eyes not yet open. The time of breeding in this region seems to be about the same as in Wyoming, because the wolves breed at about the same zone level and under similar climatic conditions.

#### MICHIGAN.

In northern Michigan, Wisconsin, Minnesota, and parts of Canada, great numbers of deer are killed by wolves during the deep snows of winter. During a hurried trip through this northern country in March and April of 1907 much information was secured, but it was too early for wolf dens. A brief circular setting forth the importance of destroying the young in the breeding dens was distributed throughout this region, and the probable time for finding pups was given as

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<sup>a</sup>A report of a litter of 4 wolf pups about 10 days old found near Fontenelle, Wyo., on March 5, and another of 10 pups on March 10, 1908, give the earliest dates of wolf pups yet received.



May and early June. From data since received it appears that in this region some wolves breed as early as April 10. A den containing 5 pups was found in the forest near Mountain Lake in the northern corner of Marquette County, Mich., on May 1, 1907. It was in a hollow log and the pups were estimated to be about three weeks old—or to have been born about April 10. There was still good tracking snow and the old wolves were trailed to the den. Two wolf dens were found near Floodwood, Dickinson County, Mich., on May 25, from which 9 pups about two weeks old were taken. The skins of two of the pups were sent to the Biological Survey for identification. A few other dens were reported from northern Michigan, but without dates. Local papers claim that more wolves were killed in the Upper Peninsula during the past season than in any two previous years. In Ontonagon County 34 wolves were killed during the past year. In Luce County 54 wolves were killed up to November 10. In Schoolcraft County 30 were killed since the 1st of October. These records, though incomplete, give a total of 118 wolves killed in 3 out of the 16 Upper Peninsula counties.

#### WISCONSIN.

Skins of pups from 3 litters of the large coyote, or brush wolf, were sent to the Biological Survey by Prof. George Wagner, of Madison, Wis. These pups were born approximately April 15, 16, and 20, respectively.

#### MINNESOTA.

In Sherburne County, Minn., where a large number of circulars were distributed, 3 dens of pups of the large coyote, or brush wolf, were found in April and May, 1907, the first ever reported in the county. As a result of these finds, many more people will hunt for coyote dens in the county the present spring.

#### ARKANSAS.

One den of wolf pups thought to be twenty days old was found near Hot Springs on May 13.

#### ELK AS ENEMIES OF WOLVES.

A statement of great practical significance bearing on the protection of stock from wolves is contained in a manuscript report on elk farming, by George W. Russ, of Eureka Springs, Ark., dated March 7, 1908. Mr. Russ states: "An elk is the natural enemy of dogs and wolves. We suffered great losses to our flock until we learned this fact; since then we have had no losses from this cause. A few elk in a thousand-acre pasture will absolutely protect the flocks therein. Our own dogs are so well aware of the danger in our elk park that they can not be induced to enter it." These observations in connec-

tion with the previously published evidence that wolves do not molest elk on their native range<sup>a</sup> suggest an important use for this noblest of our game animals, especially as the domestication and breeding of elk has become an assured success and promises profitable returns. It seems doubtful if this enmity extends to coyotes outside of pastures, however, as I have found coyote tracks common among elk herds in Wind River Mountains, and President Roosevelt reports in *Outdoor Pastimes of an American Hunter* that he saw a coyote walking unnoticed among a band of elk in the Yellowstone Park.

#### WOLVES AND COYOTES KILLED IN AND NEAR NATIONAL FORESTS IN 1907.

The Forest Service has made vigorous efforts to destroy wolves and other predatory animals on and near the national forests, and through its force of forest rangers has carried on the most systematic and successful war on these pests ever undertaken. Besides the regular force of rangers a number of expert hunters and trappers have been employed in the worst infested regions and gratifying results have been obtained. It must be borne in mind, however, that the areas thus protected are but widely separated spots in a vast extent of wolf country, and unless ranchmen and settlers are stimulated to similar efforts permanent results are not to be expected.

Following is a record of wolves and coyotes killed in 1907, furnished by the Forest Service. In many cases the records are incomplete or approximate, but they come from widely scattered localities and serve to give an idea of the success of the war against these animals. Numerous bears, mountain lions, bobcats, and other animals also were killed. In making up these reports the supervisors of the various national forests have added to the number of animals killed by forest rangers and hunters employed by the Forest Service those killed in the vicinity of the forests by ranchmen, cowboys, and professional hunters, and in many cases it has been impossible to separate the records. Also in a few cases bounty records for the county have been included. Hence the Forest Service should not be credited with the total number of animals killed.

The capture of 1,723 wolves is reported from 39 national forests, which comprise an area of 72,760 square miles. The surrounding country included may amount to as much more, making an area of about 145,520 square miles to which the reports relate, or about one-tenth of the total area inhabited by wolves in the United States.

The capture of 23,208 coyotes is reported from 77 national forests, which comprise an area of 106,746 square miles. This if doubled to

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<sup>a</sup> Wolves in Relation to Stock, Game, and the National Forest Reserves, Bull. 72 of the Forest Service, p. 18, 1907.



include the surrounding country to which the reports also refer makes an area of approximately 213,492 square miles, or about one-ninth of that inhabited by coyotes in the United States.

*Wolves and coyotes killed in or near national forests in 1907.*

[From supervisors' reports to Forest Service.]

Forest.	Wolves.	Coyotes.	Remarks.
WYOMING.			
Yellowstone-----	79	218	Old wolves, 8; pups, 71. From Crook County records.
Bear Lodge-----	925	1,165	
Medicine Bow and Sierra Madre--	5	600	
MONTANA.			
Highwood-----	22	79	Wolf pups, 16; coyote pups, 45.
Little Belt-----		24	
Big Hole-----	30	300	From bounty records of Gallatin County. Including 51 wolf pups.
Gallatin-----	15	595	
Otter-----	60	225	
Kootenai and Cabinet-----	11	141	
Hellgate-----		248	
Lewis and Clark-----		74	Numbers estimated.
Helena-----	50	550	
Absaroka and Crazy Mountain---	73	393	
IDAHO.			
Sawtooth and Payette-----	6	1,884	
Port Neuf-----		93	
Pocatello-----		15	
Raft River-----		420	
Cassia-----		640	
Bitter Root-----		18	
Weiser-----		345	
Caribou-----		306	
Salmon River-----	8	160	
UTAH.			
Dixie-----		188	From county records.
Sevier-----		1,565	
La Sal and Monticello-----		160	
Fish Lake-----		644	
Beaver-----		428	
Aquarius-----		60	
Fillmore-----		1,429	
Manti-----		405	
Uinta-----		122	
COLORADO.			
Medicine Bow-----	13	950	Of the wolves, 7 were pups.
San Juan-----	1	365	
Holy Cross-----		294	
Pikes Peak-----		346	
Wet Mountain and San Isabel-----		142	
Montezuma-----	6	55	
White River-----	45	596	
Gunnison-----		254	
OKLAHOMA.			
Wichita-----	3	15	
NEW MEXICO.			
Gila-----	<sup>a</sup> 75	242	
Magdalena-----	6	51	
San Mateo-----	6	9	
Sacramento-----	22	50	
Manzano-----	7	81	
Lincoln-----	76	77	
Mount Taylor-----		34	
Gallinas-----	40		

<sup>a</sup> On the Gila National Forest 36 wolves and 30 coyotes were killed by one forest guard, who sent the skulls to the Biological Survey for identification, as well as the skulls of 9 bears, 7 mountain lions, 17 bobcats, and 46 gray foxes. One den of 8 very young wolf pups was taken March 13.



*Wolves and coyotes killed in or near national forests in 1907—Continued.*

Forest.	Wolves.	Coyotes.	Remarks.
ARIZONA.			
Santa Rita and Dragoon-----	45	471	Presented for bounty in Santa Cruz County
Chiricahua-----	30	198	
Huachuca and Tumacacori-----	14	25	
Tonto-----	7	31	Presented for bounty in Yavapai County. Presented for bounty in Coconino County.
Prescott-----	11	120	
San Francisco-----	16	274	
Grand Canyon-----	4	305	
CALIFORNIA.			
Lassen Peak-----		26	
Klamath-----		80	
Tahoe-----		6	
Inyo and Sierra-----		112	
San Luis Obispo-----		40	
NEVADA.			
Toiyabe, Toquima, and Monitor-----		500	Approximately.
OREGON.			
Imnaha-----		914	
Blue Mountain-----		200	
Goose Lake and Fremont-----	2	2,150	
Heppner-----		26	
WASHINGTON.			
Wenaha-----		300	
Washington-----	4	375	
Olympic-----	6		

RECAPITULATION BY STATES.

Wyoming-----	1,009	1,983	
Montana-----	261	2,629	
Idaho-----	14	3,881	
Washington-----	10	675	
Colorado-----	65	2,362	
Oklahoma-----	3	15	
New Mexico-----	232	544	
Arizona-----	127	1,424	
Utah-----		5,001	
Nevada-----		500	
California-----		224	
Oregon-----	2	3,290	
Total-----	1,723	23,208	

The following directions for destroying wolves are republished, with slight changes, from Circular 55 of the Biological Survey.

CAPTURE OF PUPS.

By the destruction of the young the increase of wolves and coyotes may be prevented more effectually and economically than by any other way. The large size of the litters makes the method especially important, as wolves usually have 6 to 10 pups, and coyotes 5 to 9. It is now positively known that both wolves and coyotes pair for the breeding season, and that the males stay with the females and help feed and care for the pups during the summer. Wolves and probably coyotes do not breed until 2 years old, which accounts for the presence of roving bands during the breeding season.

## LOCATION OF DENS.

In the western United States wolves breed mainly in valley and foothill country or in low mountains. For breeding dens they choose, if possible, natural cavities or washed-out hollows on south slopes of rocky or bad-land ridges. There is usually a high point not far from the den, where the old male stands guard during the day. In timbered regions wolves breed in hollow logs or such cavities as can be found.

In the north good tracking snow usually lies on the ground during the early part of the breeding season, which renders the finding of dens particularly easy, but even on bare ground there is little difficulty in locating every wolf den. This may be done simply by riding along the crests of the ridges until wolf tracks are found. The tracks once found, the direction of the den can often be told from the lay of the land. Near the den the tracks usually gather into well-worn trails that may be followed on bare ground as readily as on snow.

Coyotes make their dens in the same kind of places as wolves, and also dig burrows or use old badger holes, slightly enlarged, so a spade is often necessary to get at the young.

Ranchmen can not afford to let wolf or coyote pups grow up on or near their ranges, when an hour's ride will often serve to locate the dens.

## TRAPPING.

For wolves the best No. 4 double-spring trap with heavy welded or special wolf chain should be used. If the trap is to be fastened to a stationary object, the chain should have a swivel at each end. If to a drag, one swivel next to the trap is enough. Always use a drag if possible. The best is a stone of 30 or 40 pounds weight, to which the chain is securely wired. A long oval stone is best. A piece of telegraph wire or smooth fence wire 5 or 6 feet long should be passed around one end of the stone; then doubled through the trap ring, with a twist to hold the ring in the middle; then around the other end of the stone and back on the opposite side to connect with the first loop. If properly fastened, a jerk on the trap tends to draw together and tighten the loops, and the spring of the connecting wire prevents a sudden jar that might break trap or chain. If an oval stone is not at hand, a triangular or square stone may be used by passing the wire over the three or four sides and securely connecting it above and below.

If no stones are to be had and it is necessary to stake the traps, twisted iron stakes that can be driven below the surface of the ground should be used. They should be of good iron straps, at least 18 inches long, three-fourths of an inch wide, and three-sixteenths of an



inch thick, turned over at the top into a P-shaped loop to connect with the ring of the trap chain.

When possible, place the trap between two tufts of grass or weeds, so it can be readily approached from one side only. Bury the stone, chain, and trap out of sight, with the trap nearest to the runway where the wolves follow a trail or road, cross a narrow pass, or visit a carcass. The trap should be flush with the surface of the ground and the jaws and pan covered with a piece of paper to keep the earth from clogging under the pan. Fine earth should then be sprinkled over the paper until all traces of trap and paper are concealed. The surface of the ground and surroundings should appear as nearly as possible undisturbed. The dust may be given a natural appearance by sprinkling it with water. Touching the ground or other objects with the hands, spitting near the trap, or in any way leaving a trace of human odors near by should be avoided. Old, well-scented gloves should be worn, and a little of the scent used for the traps should be rubbed on the shoe soles. A piece of old cowhide may be used to stand on and to pile the loose earth on while burying the drag and trap.

For coyotes use the best No. 3 double-spring trap, unless in a wolf country, where it is better to use a trap strong enough to hold a wolf. In setting the trap use the same method and bait as for wolves, but the traps may be staked or fastened to a stationary object with more safety.

#### USE OF SCENTS.

Success in trapping depends largely on the use of a scent that will attract wolves and coyotes to the traps and keep them tramping and pawing there until caught. Meat bait alone is of little use, and often, indeed, scares the animals away. Of the many scents and combinations tested the fetid bait has proved most successful.

*Fetid bait.*—Place half a pound of raw beef or venison in a wide-mouthed bottle and let it stand in a warm place (but not in the sun) for two to six weeks, or until it is thoroughly decayed and the odor has become as offensive as possible. When decomposition has reached the proper stage, add a quart of sperm oil or any liquid animal oil. Lard oil may be used, but prairie-dog oil is better. Then add 1 ounce of pulverized asafetida and 1 ounce of tincture of Siberian musk or Tonquin musk. If this can not be procured, use in its place 1 ounce of dry, pulverized castoreum (beaver castor) or 1 ounce of the common musk sold for perfumery. Mix well and bottle securely until used.

After setting the trap, apply the scent with a stick or straw or by pouring from the bottle to the grass, weeds, or ground on the side of



the trap opposite that from which the wolf would naturally approach. Never put scent on the trap, as the first impulse of the wolf after sniffing the scent is to roll on it.

This bait is very attractive also to cattle and horses, which are sure to tramp over and paw out the traps if set where they can be reached.

#### POISONING.

No poison has yet proved so effective as pure sulphate of strychnine, provided the proper dose is used. The most effective dose is 4 grains for wolves and 2 grains for coyotes. The common 3-grain gelatin capsules sold by druggists will hold, if well filled, 4 grains of strychnine and are better than the larger capsules. The regular 2-grain capsules should be used for coyotes. The capsules should be filled, securely capped, and every trace of the intensely bitter drug wiped from the outside.

Each capsule should be inserted in a piece of beef suet the size of a walnut and the cavity securely closed, to keep out moisture. Lean meat should not be used, as the juice soon dissolves the gelatin of the capsule. The necessary number of poisoned baits may be prepared and carried in a tin can or pail. They should never be handled except with gloved hands or forceps. The baits may be dropped from horseback along a scented drag line made by dragging an old bone or piece of hide well saturated with the fetid scent, or they may be placed around or partly under any carcass on which the wolves or coyotes are feeding, or along trails which they are in the habit of following.

Gelatin capsules quickly dissolve in the juices of the stomach. Strychnine taken on an empty stomach sometimes kills in a very few minutes, but on a full stomach its action is much slower, and the animal may have time to travel a considerable distance.

#### WOLF AND COYOTE PROOF FENCES.

Under present conditions it is entirely impracticable to fence any great part of the western stock range against wolves and coyotes, but in many cases limited areas may be fenced to advantage. In sections where cattle are fed during the winter months wolves often kill them on the open feeding grounds. These, as well as small home pastures, for both cattle and sheep, may be inclosed with wolf and coyote proof fences at relatively slight cost, often less than the value of the stock killed during one season.

On posts 7 feet long, set a rod or a rod and a half apart, should be stretched one closely barbed wire along the surface of the ground. Three inches above this should be set a 36-inch strip of woven-wire

fence of not over 5-inch mesh, and above this two barbed wires 6 inches apart. In the North another wire, 8 inches above these, may be added to provide for a moderate depth of snow, making a close fence practically 5 feet high. To prevent the wires from sagging away from each other, a vertical wire may be wrapped about each, at intervals of 8 feet, by a hand machine.

A fair grade of suitable 36-inch woven wire may be bought at an initial cost of 25 to 35 cents a rod, and barbed wires from 3 to 5 cents per rod each. The actual cost of fence, made as directed, can be computed only for localities where the cost of barbed wire, posts, and labor is known, but usually need not exceed 50 to 75 cents per rod for materials.

[Cir. 63]

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